State of Louisiana
Department of Natural Resources
Coastal Restoration Division and
Coastal Engineering Division

2005 Operations, Maintenance, and Monitoring Report

for

Marsh Island Hydrologic Restoration

State Project Number TV-14
Priority Project List 6

June 2005
Iberia Parish

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2005 Operations, Maintenance, and Monitoring Report
for
Marsh Island Hydrologic Restoration (TV-14)

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Preface

The Operations, Maintenance, and Monitoring (OM&M) Report format is a streamlined approach that combines the Operations and Maintenance annual project inspection information with the Monitoring data and analyses on a project-specific basis. This report includes monitoring data collected through December 2004, and annual Maintenance Inspections through June 2005.

The 2005 report is the second in a series of reports. For additional information on lessons learned, recommendations, and project effectiveness, please refer to the 2004 Operations, Maintenance, and Monitoring Report on the Louisiana Department of Natural Resources (LDNR) web site at dnr.louisiana.gov (Barrilleaux and Juneau 2007).

I. Introduction

The Marsh Island Hydrologic Restoration Project (TV-14) is located in Iberia Parish approximately six miles south of Cypremort Point. The project area encompasses approximately 6,697 ac (2,710 ha) of wetlands on the northeast tip of Marsh Island east of Bayou Blanc (figure 1). It comprises 5,034 ac (2,037 ha) of brackish marsh and 1,663 ac (673 ha) of open water, based on the Louisiana Department of Natural Resource's GIS data for 1984. Common plant species found in the project area include *Juncus roemerianus* (needlegrass rush), *Spartina patens* (saltmeadow cordgrass), *Schoenoplectus maritimus* (cosmopolitan bulrush), *Schoenoplectus americanus* (chairmaker's bulrush), *Spartina alterniflora* (saltmarsh cordgrass), and *Vigna luteola* (hairypod cowpea) (Chabreck and Linscombe 1988; United States Department of Agriculture, Natural Resources Conservation Service [USDA/NRCS] 2002).

Between 1930 and the present, the hydrology of Marsh Island has changed due to tidal-influenced erosion, subsidence, and oil and gas exploration (Orton 1959; United States Department of Agriculture, Soil Conservation Service [USDA/SCS] 1978). Several oil field canals were constructed to facilitate oil and gas exploration in the project area during the 1950's. Recent deterioration and subsidence of the spoil banks deposited in the 1950's have resulted in cuts in the spoil banks that have become conduits for rapid tidal exchanges between the surrounding bays and the interior marshes. These rapid exchanges have resulted in tidal scouring and the loss of marsh vegetation through erosion and subsidence. Lake Sand and a number of interior lakes also supported a significant amount of submerged aquatic vegetation (SAV). These lakes are almost devoid of SAV, presumably due to the effects of increased tidal exchange and increased turbidity. Erosion has also led to the deterioration of the northeast end of Marsh Island and the north rim of Lake Sand, leaving exposed a highly organic brackish marsh.

During the life of the 20-year project, 408 ac (168 ha) of wetlands will be protected (U.S. Army Corps of Engineers [USACE] 1994). The project consists of the construction of nine plugs in oil and gas canals at the northeast end of Marsh Island, the protection of the northeast shoreline of Marsh Island, and the isolation of Lake Sand from Vermilion Bay with a free-standing rock breakwater (figure 1). Project construction began on July 25, 2001, with the construction of approximately 4,000 linear feet (1,291 m) of rock breakwater to protect the north shoreline on Lake Sand by contractor Tacon Company, Inc. of Bartlett, Tennessee, and subcontractor Luhr Brothers, Inc. of Columbia, Illinois. A total of seven canals were plugged with rock armor while one was plugged with an earthen closure only. An additional closure, constructed of painted steel sheetpile and rock armor, was constructed at the mouth of an oil exploration canal on the eastern end of the project area. Construction of the $2.9 million project was completed on December 12, 2001.

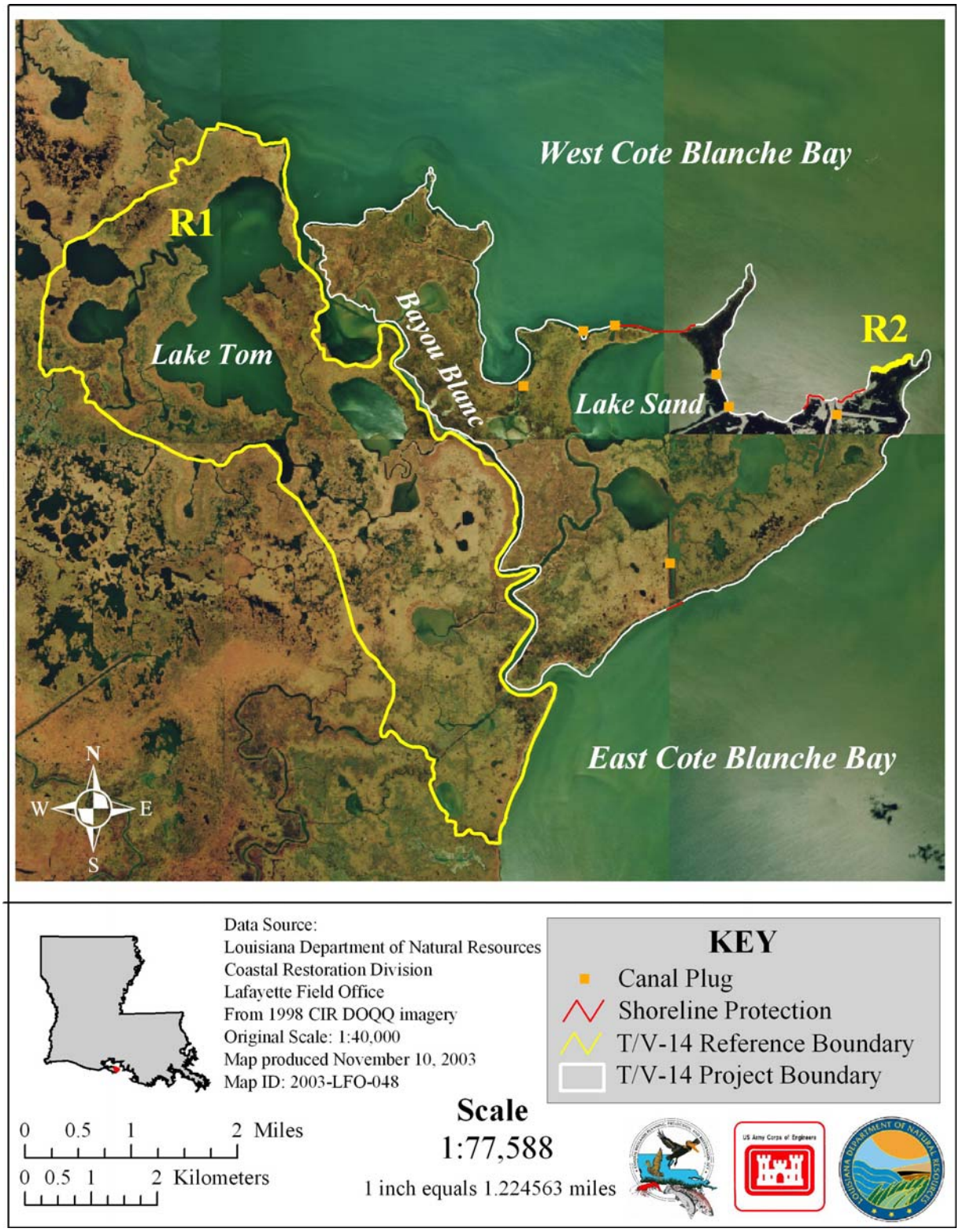

Figure 1. Marsh Island Hydrologic Restoration (TV-14) project boundary and features.

II. Maintenance Activity

a. Project Feature Inspection Procedures

The purpose of the annual inspection of the Marsh Island Hydrologic Restoration Project (TV-14) is to evaluate the constructed project features to identify any deficiencies and prepare a report detailing the condition of project features and recommended corrective actions needed. Should it be determined that corrective actions are needed, LDNR shall provide, in the report, a detailed cost estimate for engineering, design, supervision, inspection, and construction contingencies, and an assessment of the urgency of such repairs. As noted in Appendices A, B, and C, initial project goals included documenting inspections with photographs, creating a three-year budget projection, and taking field inspection notes.

An inspection team consisting of two representatives of LDNR and one representative of USACE performs annual visual inspections. If damage is apparent, LDNR and USACE assign a team to perform a detailed inspection and report on the findings. The team documents the condition of the project features and may employ a survey party to make detailed measurements.

b. Inspection Results

No inspection was conducted in calendar year 2005 since this project is currently under a maintenance event.

c. Maintenance Recommendations

i. Immediate/ Emergency Repairs

Construction to repair the damages caused by Hurricane Lili should begin in summer 2005. These repairs consist of raising the Lake Sand Closure dike back to a functional elevation in areas as required, as well as extending the wingwalls and paving the marsh around Canal Closure #5 with rock.

ii. Programmatic/ Routine Repairs

No routine repairs are required at this time.

d. Maintenance History

2005 Maintenance Project–Grillot, Inc. (Through lease agreement with Bertucci Contracting Corp.) This maintenance project included the placement of paving stone (18 in. [0.5 m] thick) spread out around the wingwalls of the plug at Lake Sand Canal No. 5 Closure to “harden” the area while still allowing flow in extreme tidal events to pass around the structure without washing away the existing bank. Also included was the extension of the rock dike on the southern end of Canal No. 5. Approximately 4,000 tons of 1000# stone was placed on Lake Sand Closure No. 4 to reconstruct the rock dike where stone was displaced.

This maintenance project was a result of damages that occurred during Hurricane Lili in 2002. The costs associated with the engineering, design, and construction of the Marsh Island Maintenance Project are as follows:

Construction (FEMA)	$267,059.11*
Construction (CWPPRA)	$ 64,092.00
E & D, construction oversight, as-builts	$ 30,262.00
TOTAL CONSTRUCTION COST:	**$361,413.11**

* This cost was reimbursed by FEMA

III. Operation Activity

a. Operation Plan

There are no water control structures associated with this project, therefore no Structural Operation Plan is required.

b. Actual Operations

There are no water control structures associated with this project, therefore no Structural Operation Plan is required.

IV. Monitoring Activity

Pursuant to a Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) Task Force decision on August 14, 2003, to adopt the Coastwide Reference Monitoring System-*Wetlands* (CRMS-*Wetlands*) for CWPPRA, updates were made to the TV-14 Monitoring Plan to merge it with CRMS-*Wetlands* and provide more useful information for modeling efforts and future project planning while maintaining the monitoring mandates of the Breaux Act.

a. Monitoring Goals

The objective of the Marsh Island Hydrologic Restoration Project is to restore more natural hydrologic conditions in the project area resulting in the protection of the existing marsh.

The following goals will contribute to the evaluation of the above objective:

1. Reduce water level variability in the project area.
2. Decrease the rate of marsh loss in the project area.
3. Reduce erosion rate of the northeast shoreline of Marsh Island.
4. Increase the occurrence of submerged aquatic vegetation in Lake Sand and in shallow open water within the project area.

b. Monitoring Elements

Aerial Photography:
Near-vertical color-infrared aerial photography (1:12,000 scale) was used to measure vegetated and non-vegetated areas for the project and reference areas. The photography was obtained in 2000 prior to project construction and approximately three years post-construction in 2004. Additional photography will be acquired in 2009 and 2016. The original photography was checked for flight accuracy, color correctness, and clarity and was subsequently archived. Aerial photography was scanned, mosaicked, and georectified by U.S. Geological Survey/National Wetlands Research Center (USGS/NWRC) personnel according to standard operating procedures (Steyer et al. 1995, revised 2000) (figure 2).

Shoreline Change:
To document shoreline movement along the northeast shoreline of Marsh Island, a differential GPS (DGPS) survey of unobstructed sections of shoreline was conducted at the vegetative edge of the bank to document the position of the shoreline in 1999 (pre-construction) and 2003 (post-construction) (figures 3-4). Subsequent surveys will be conducted post-

construction in 2005, 2009, and 2016. A similar survey will be conducted concurrently along a 2,000-ft (609.6-m) section of reference area 2 (R2). DGPS shoreline positions were mapped

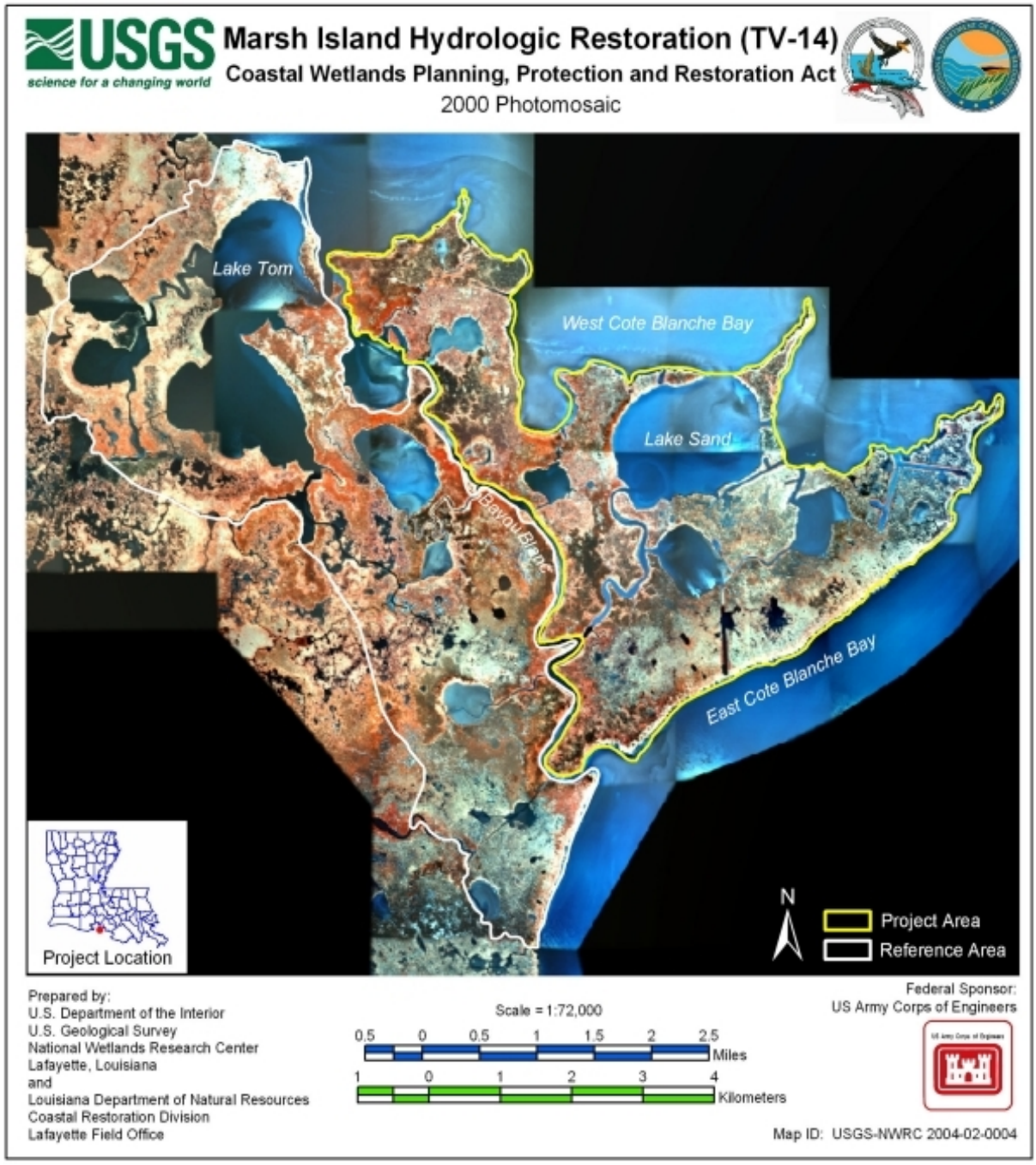

Figure 2. Photomosaic of the 2000 color-infrared aerial photography for the TV-14 project and reference areas from aerial photography taken November 27, 2000.

and used to compare shoreline erosion/growth rates in the project area and in R2 using GIS analysis.

Water Level:

Water level variability is monitored hourly at two continuous data recorders deployed in the project area and at two continuous data recorders deployed in reference area 1 (R1) (figure 5). Staff gages adjacent to the continuous recorders were surveyed to correlate water levels to a known datum, the North American Vertical Datum of 1988 (NAVD88). Continuous data recorders were installed in October 1999 and will document hourly water level data until December 2006, a period of five years following project construction.

Figure 3. Aerial view of the northeastern shore (left edge of photo) of the TV-14 project.

Figure 4. Shoreline configuration of the eastern shore of the TV-14 project.

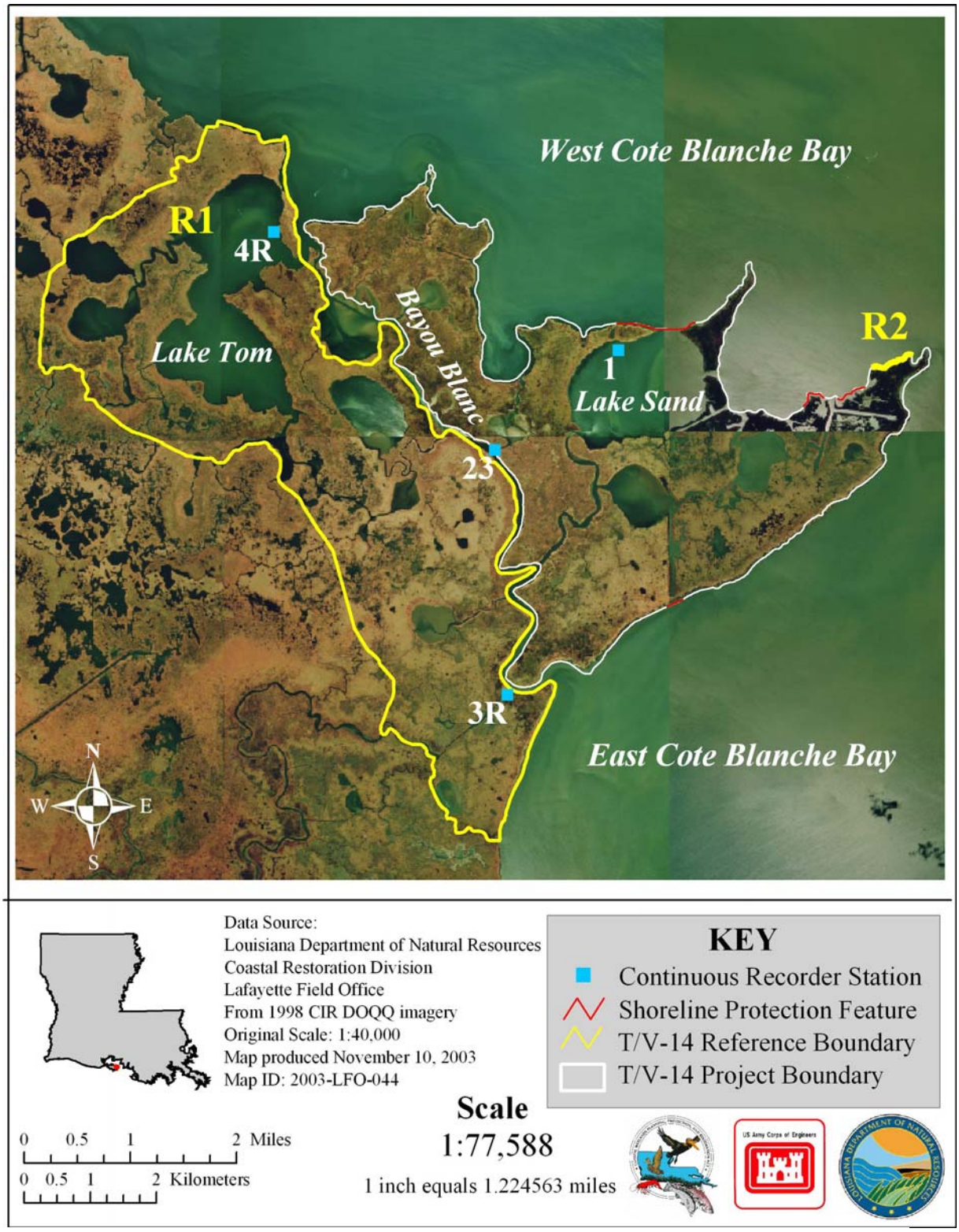

Figure 5. Continuous hydrographic monitoring stations for the TV-14 project.

IV. Monitoring Activity (continued)

Submerged Aquatic Vegetation (SAV):

SAV was monitored using the rake method (Chabreck and Hoffpauir 1962). Restoration of the Lake Sand shoreline is expected to influence SAV primarily in Lake Sand, while canal plugs and spoil bank repair work are expected to influence SAV primarily in other shallow open water areas. Separate tests were therefore used to evaluate SAV in Lake Sand and in shallow open water areas. The frequency of occurrence of SAV in Lake Sand was compared to the frequency of occurrence of SAV in Lake Tom found in R1. Three parallel transects were established and separated by a distance approximately equal to one-fourth the pond width (figure 6). Each transect is composed of a minimum of 25 equally spaced sampling stations. At each station, aquatic vegetation was sampled by dragging a garden rake on the pond bottom for one second. The presence of vegetation was recorded to determine the frequency of aquatic plant occurrence (frequency = number of occurrences/25 x 100). When vegetation was present, the species present were recorded in order to determine the frequencies of individual species (Nyman and Chabreck 1996). In shallow open water areas, three small ponds in the project area were compared to three small ponds in R1. Two parallel transects, separated by a distance approximately equal to one-third the pond width, were established in each pond and investigated using similar sampling techniques as discussed above. Ancillary salinity data, collected with continuous data recorders and monthly discrete samples, will be evaluated in concert with the statistical analysis to aid in the interpretation of SAV data. SAV was monitored in the fall preceding construction in 1999 and in post-construction years 2002 and 2004, and will be surveyed in 2006, 2009, 2011, 2013, and 2016.

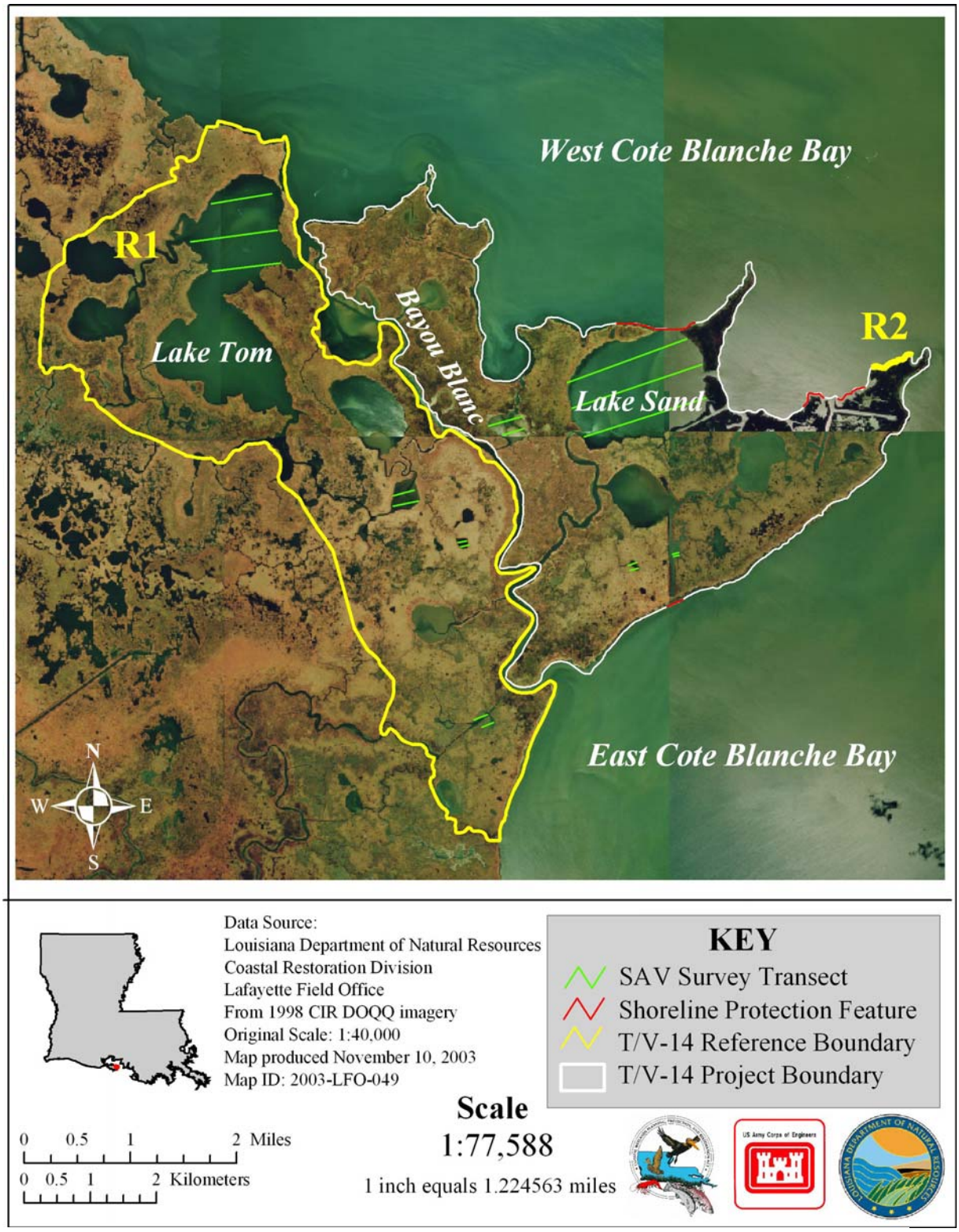

Figure 6. SAV monitoring survey transects for the TV-14 project and reference areas.

IV. Monitoring Activity (continued)

c. Preliminary Monitoring Results and Discussion

Aerial Photography:

Pre-construction classification (2000) indicated 69.8% land and 30.2% water within the project area and 64.4% land and 35.6% water within R1 (figure 7). The next scheduled aerial photography was collected in November 2004 and the classified imagery obtained will be included in the next report.

Shoreline Position:

The 2003 data were processed and compared to the preconstruction dataset to determine changes in shoreline position and configuration (figure 8). GIS analysis of the shoreline datasets indicated a loss of 2.07 ac (0.84 ha) and a gain of 1.85 ac (0.75 ha) for a net loss of 0.22 ac (0.09 ha) in the project area between 1999 and 2003. In the reference area, a net loss of 0.05 ac (0.02 ha) was documented. However, since the preconstruction shoreline position was documented more than three years prior to project construction, this loss may not necessarily be attributable to project features. There is also some degree of error due to limitations in the GPS technology used for the surveys, as well as temporal variations in water level, which may affect data accuracy. This amount of loss is not considered to be ecologically significant.

Water Level:

Hourly salinity and relative water level data for the two project and two reference stations for 2004 are presented in figures 9–12. Minimum, maximum, and mean water levels within the project area were all significantly lower ($P<0.0001$) than in R1 during the year (figure 13). Daily water level variability was significantly lower (0.13 ft [0.04 m]) within the project area than in R1 during 2003 (figure 14). As this decrease in water level variability was relatively small, the biological significance of this change could not be determined without more detailed vegetation sampling and analysis.

Station	Data collection period
TV14-01	10/12/1999 – present
TV14-02*	10/12/1999 – 3/14/2002
TV14-23	3/14/2002 – present
TV14-03R	10/12/1999 – present
TV14-04R	10/12/1999 – present

*The continuous recorder at TV14-02 was removed because of access problems following project construction. The replacement station, TV14-23, was installed closer to Bayou Blanc, a more accessible location.

Submerged Aquatic Vegetation (SAV):

Percent cover of SAV was significantly higher (13%) in R1 than in the project area prior to construction in 1999. Pre-construction SAV abundance in the project area was 1% while the reference area abundance was 14%. The common SAV species encountered during the pre-construction and post-construction abundance surveys are presented in tables 1 and 2, respectively. Post-construction SAV abundance was determined in the fall of 2004. SAV abundance in the project area was 16% while the reference area abundance was 23%. The data indicate that while R1 still had a higher abundance than the project area, this difference was significantly less than it was in 1999, prior to project construction. Although SAV abundances are temporally highly variable due to numerous environmental factors, the data indicate that a significant increase in SAV abundance following construction was observed. This increase could indicate a project effect due to reduced water level variability and reduced turbidity. More data will be needed to better evaluate whether long-term changes in SAV abundance exist.

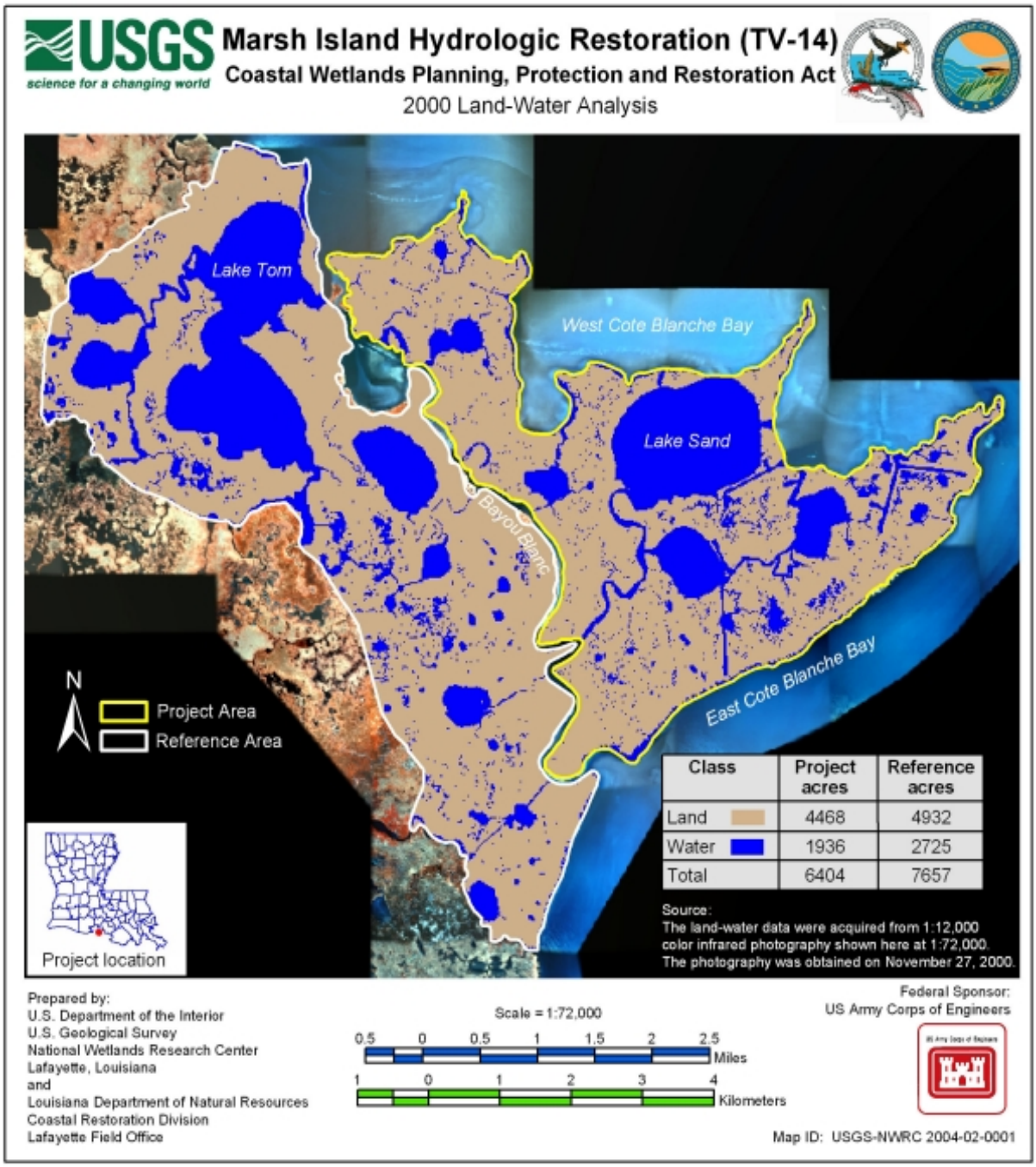

Figure 7. Results of the 2000 land:water GIS image classification for the TV-14 project and reference areas from aerial photography taken November 27, 2000.

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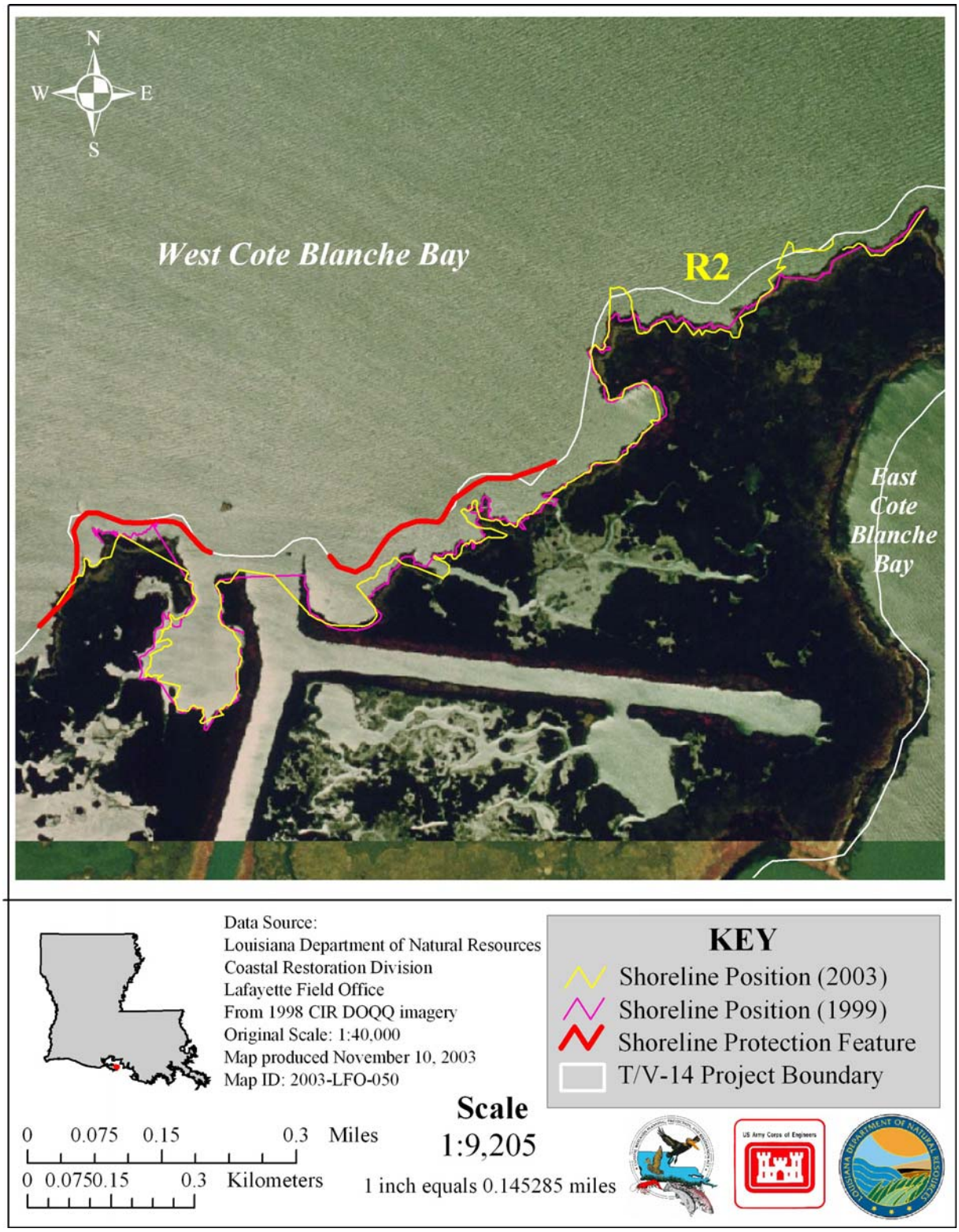

Figure 8. Comparison of shoreline position in 1999 and 2003 for the TV-14 project and reference areas.

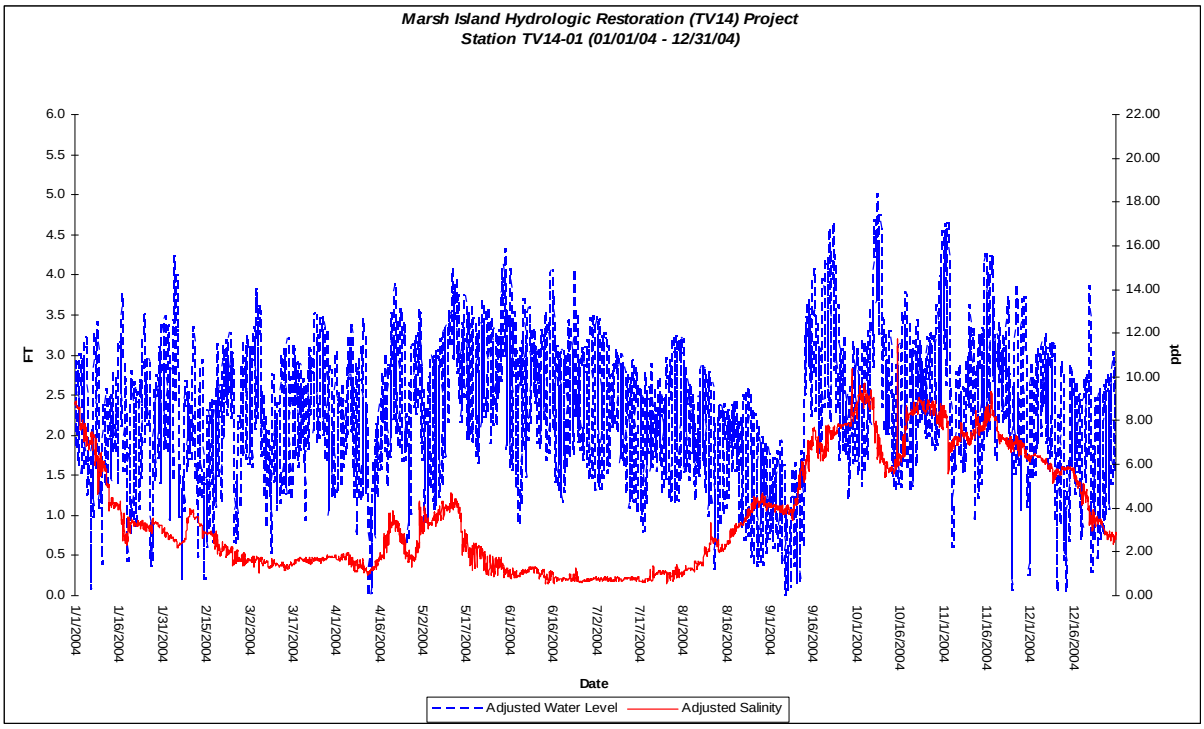

Figure 9. Salinity and relative water level data from 2004 for TV-14 project Station 1, in feet.

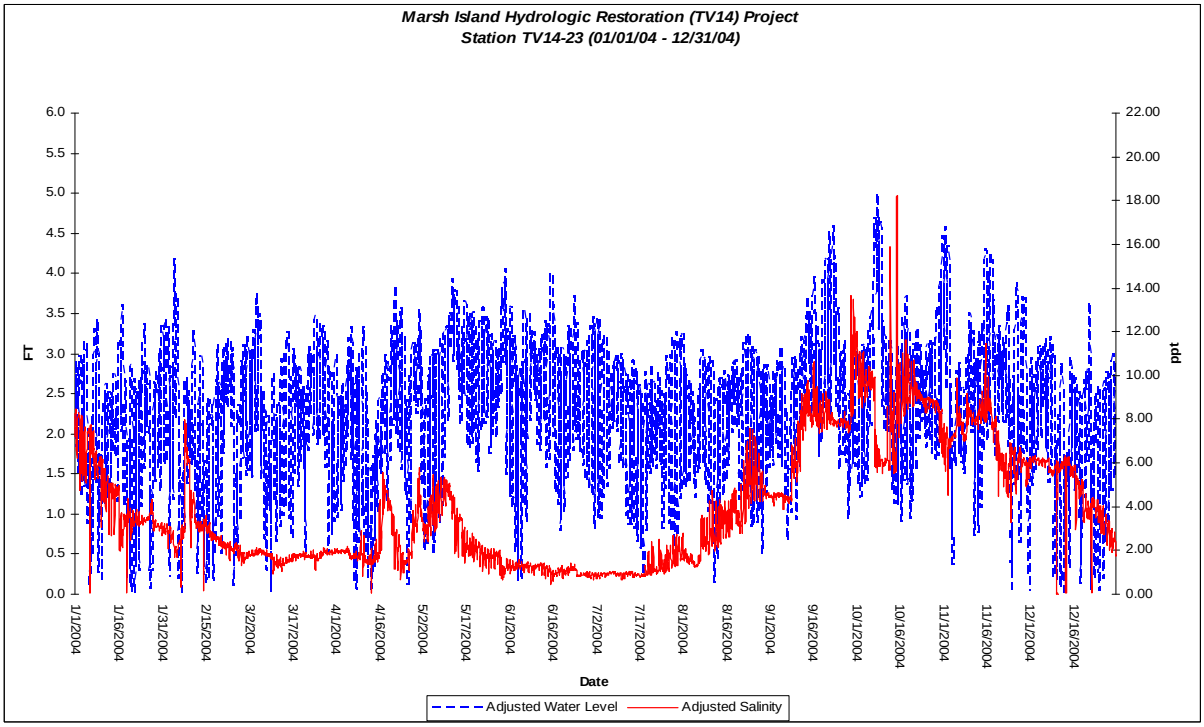

Figure 10. Salinity and relative water level data from 2004 for TV-14 project Station 23, in feet.

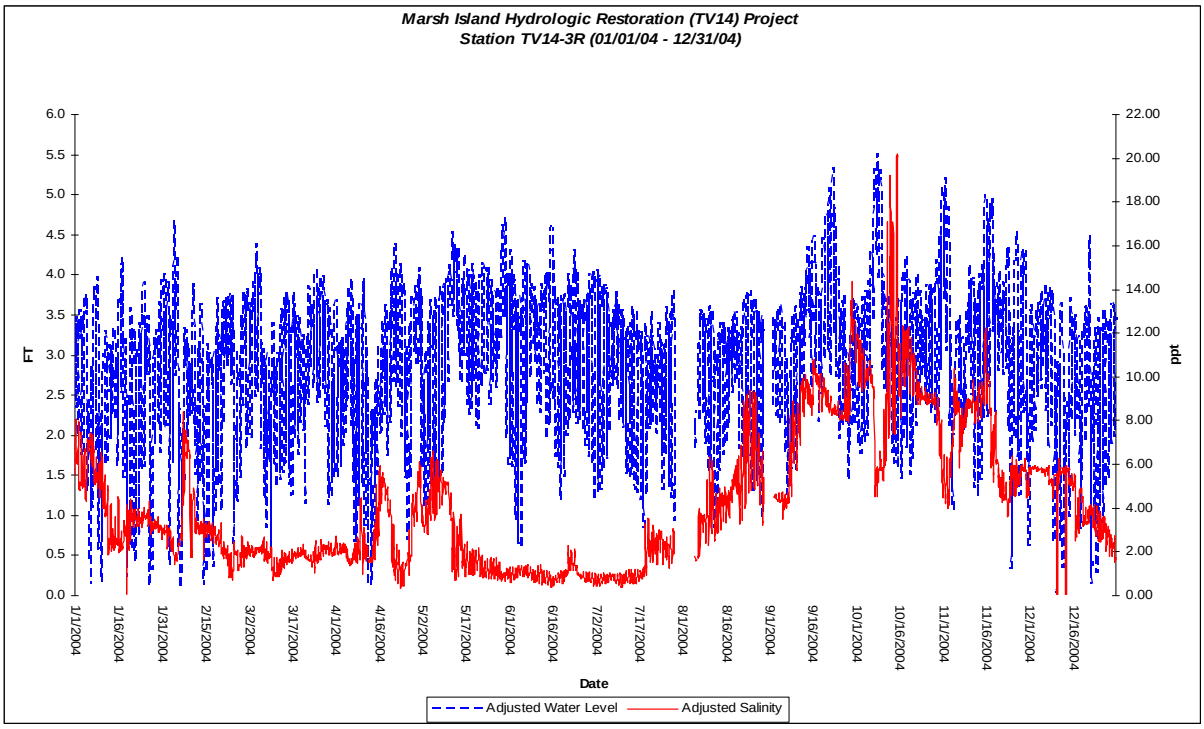

Figure 11. Salinity and relative water level data from 2004 for TV-14 project Station 3R, in feet.

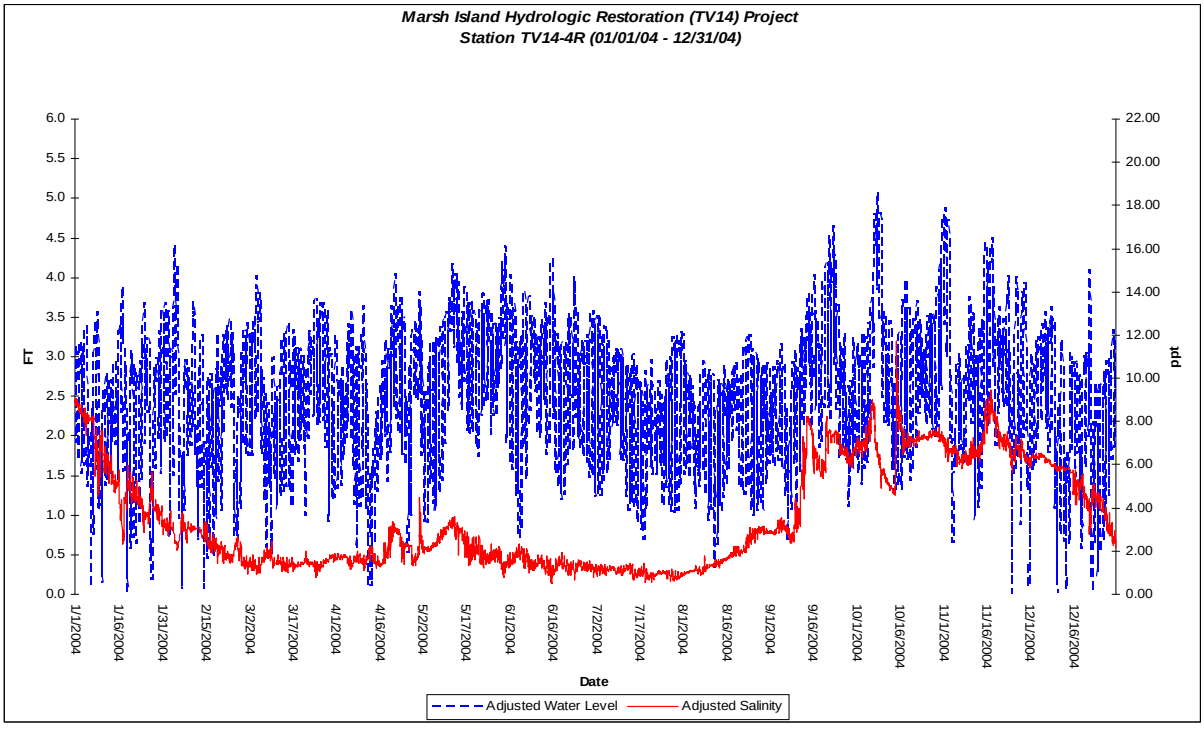

Figure 12. Salinity and relative water level data from 2004 for TV-14 project Station 4R, in feet.

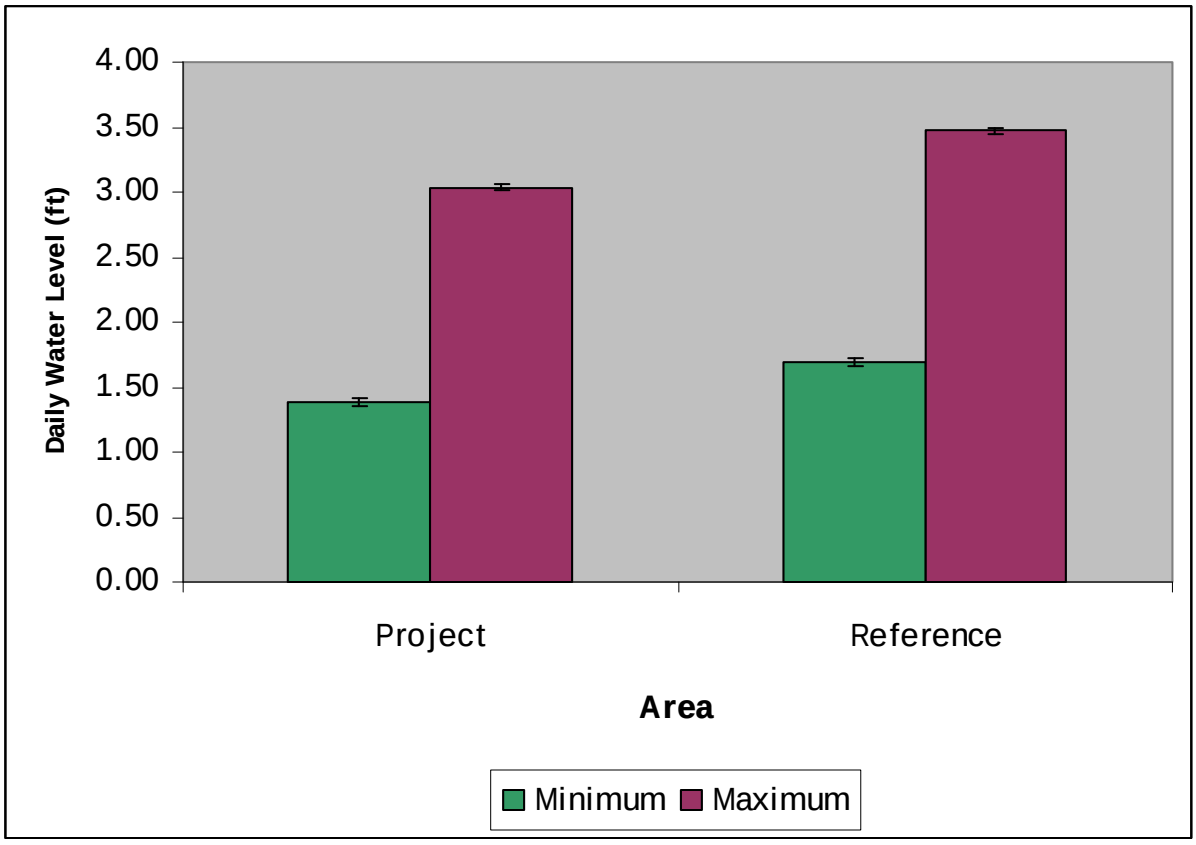

Figure 13. Relative minimum and maximum water levels for project (TV-14) vs. reference areas, in feet.

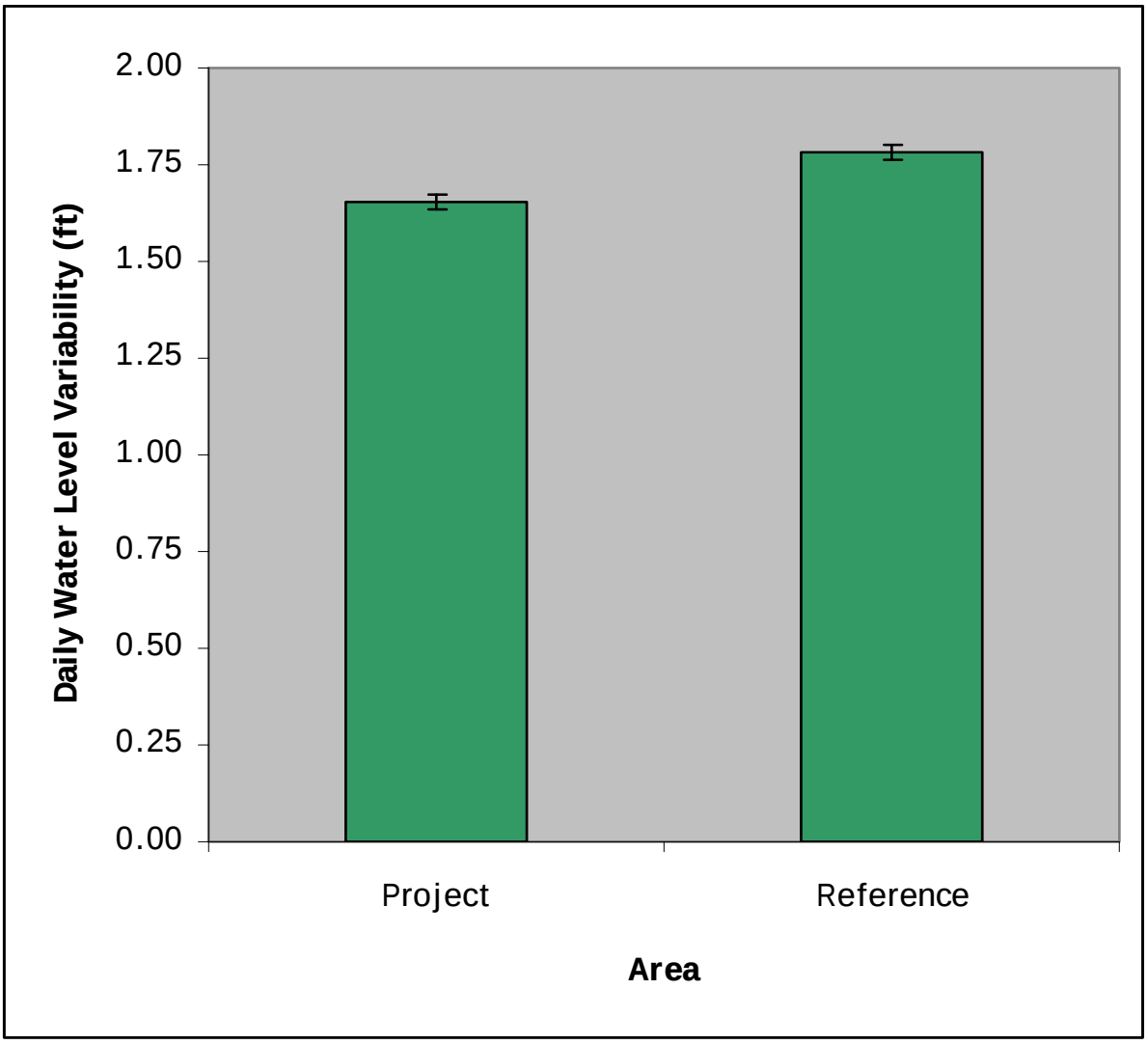

Figure 14. Relative water level variability for project (TV-14) vs. reference areas, in feet.

Table 1. SAV species encountered during the abundance survey (pre-construction)- 10/28/1999

Scientific Name	Common Name
Algae spp.	Alga
Cabomba caroliniana	Common Fanwort
Myriophyllum spicatum	Eurasian Watermilfoil
Ruppia maritima	Widgeon Grass

Table 2. SAV species encountered during the abundance survey (post-construction)- 10/05/2004

Scientific Name	Common Name
Algae spp.	Alga
Myriophyllum spicatum	Eurasian Watermilfoil

V. Conclusions

a. Project Effectiveness

The shoreline stabilization component of this project has resulted in a net change of -0.22 ac (-0.09 ha) within the project area, whereas the reference area decreased by -0.05 ac (0.02 ha). Some portions of the shoreline have eroded, while others prograded, and some portions experienced no change. At this time, the effectiveness of the shoreline protection component of the project is unclear. No shoreline data was collected in 2004. The next shoreline position survey is scheduled for fall 2005.

The project thus far seems to be effective in reducing water level variability within the project area. Future analysis will provide information relative to the project's impacts on the sustainability of the vegetated wetlands on Marsh Island and the biological significance of this reduction in water level variability.

SAV abundance has increased in the project area (approximately two-fold) since project construction. This could be due to project effects or unrelated environmental factors. The next SAV survey is scheduled for fall 2006.

b. Recommended Improvements

Hurricane Lili damage imposed on the structure components of the project will be repaired in the summer of 2005 through a Federally Emergency Management Association- (FEMA-) funded construction contract.

c. Lessons Learned

The availability of an initial immediate post-construction location of as-built shoreline position survey in 2001 could have provided a better assessment of the effectiveness of the shoreline protection component of the project. Additionally, more timely elevation surveys to establish vertical locations of monitoring instruments and staff gauges following station damage would greatly improve the ability to assess project effectiveness much faster, allowing better management of project features.

The ends of all plugs, closures, or weir type structures that are constructed in or across canals or bayous should be constructed such that a blanket of 16 to 18 in. (41-46 cm) of Type 110# stone is placed over the adjacent marsh bank of the immediate area of the ends of the structure. The purpose of this bank paving is to make the adjacent bank or marsh area "hard," to resist the erosive effect of storm or abnormal high tidal flow when such events occur. Stone placed should be to areas of varying size or diameter, dependant on size of canal or bayou that will be conveying the flow, and stone should be dropped and tamped into the marsh or bank so as to not raise the elevation of the area. This lesson learned evolves from our experience at observing damage caused by high tide and storm events at ends of various structures

described above. Basically stated, the erosion problem occurs when unusually high water flow, into or out of the marsh, develops at a structure. The wall or sides of the structure restrict the flow for a portion of the structure that is higher in elevation than adjacent marsh, such that the flow continues but is much higher in velocity at each end of the structure. This higher-velocity flow then causes erosion at ends of the structure.

VI. REFERENCES

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Appendix A
(Inspection Photographs)

No inspection was conducted in calendar year 2005 because this project is currently under a maintenance event, therefore no photographs were available.

Appendix B
(Three-Year Budget Projection)
MARSH ISLAND HR / TV14 / PPL6
Three-Year Operations & Maintenance Budgets 07/01/2005 - 06/30/08

Project Manager	O & M Manager	Federal Sponsor	Prepared By
		COE	

	2005/2006	2006/2007	2007/2008
Maintenance Inspection	$ 4,955.00	$ 5,119.00	$ 5,288.00
Structure Operation	$ -	$ -	$ -
Administration	$ -	$ -	$ -
Maintenance/Rehabilitation			

05/06 Description:

E&D	$ -
Construction	$ -
Construction Oversight	$ -
Sub Total - Maint. And Rehab.	$ -

06/07 Description

E&D		$ -
Construction		$ -
Construction Oversight		$ -
	Sub Total - Maint. And Rehab.	$ -

07/08 Description:

E&D			$ -
Construction			$ -
Construction Oversight			$ -
		Sub Total - Maint. And Rehab.	$ -

	2005/2006	2006/2007	2007/2008
Total O&M Budgets	**$ 4,955.00**	**$ 5,119.00**	**$ 5,288.00**

OPERATION AND MAINTENANCE BUDGET 07/01/2005-06/30/2006

MARSH ISLAND HR/TV-14/PPL6

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	$4,955.00	**$4,955.00**
General Structure Maintenance	LUMP	1	$0.00	**$0.00**
Engineering and Design	LUMP	1	$0.00	**$0.00**
Operations Contract	LUMP	1	$0.00	**$0.00**
Construction Oversight	LUMP	1	$0.00	**$0.00**

ADMINISTRATION

LDNR / CRD Admin.	LUMP	0	$0.00	$0.00
FEDERAL SPONSER Admin.	LUMP	0	$0.00	$0.00
SURVEY Admin.	LUMP	0	$0.00	$0.00
OTHER				$0.00
			TOTAL ADMINISTRATION COSTS:	**$0.00**

MAINTENANCE / CONSTRUCTION

SURVEY

SURVEY DESCRIPTION:					
Secondary Monument	EACH	0	$0.00	$0.00
Staff Gauge / Recorders	EACH	0	$0.00	$0.00
Marsh Elevation / Topography	LUMP	0	$0.00	$0.00
TBM Installation	EACH	0	$0.00	$0.00
OTHER				$0.00
			TOTAL SURVEY COSTS:	**$0.00**

GEOTECHNICAL

GEOTECH DESCRIPTION:				
Borings	EACH	0	$0.00	$0.00
OTHER				$0.00
			TOTAL GEOTECHNICAL COSTS:	**$0.00**

CONSTRUCTION

CONSTRUCTION DESCRIPTION:					
Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
	0	0.0	0	$0.00	$0.00
	0	0.0	0	$0.00	$0.00
	0	0.0	0	$0.00	$0.00
Filter Cloth / Geogrid Fabric		SQ YD	0	$0.00	$0.00
Navagation Aid		EACH	0	$0.00	$0.00
Signage		EACH	0	$0.00	$0.00
General Excavation / Fill		CU YD	0	$0.00	$0.00
Dredging		CU YD	0	$0.00	$0.00
Sheet Piles (Lin Ft or Sq Yds)			0	$0.00	$0.00
Timber Piles (each or lump sum)			0	$0.00	$0.00
Timber Members (each or lump sum)			0	$0.00	$0.00
Hardware		LUMP	1	$0.00	$0.00
Materials		LUMP	1	$0.00	$0.00
Mob / Demob		LUMP	1	$0.00	$0.00
Contingency		LUMP	1	$0.00	$0.00
General Structure Maintenance		LUMP	1	$0.00	$0.00
OTHER				$0.00	$0.00
OTHER				$0.00	$0.00
OTHER				$0.00	$0.00
				TOTAL CONSTRUCTION COSTS:	**$0.00**

TOTAL OPERATIONS AND MAINTENANCE BUDGET: **$4,955.00**

OPERATION AND MAINTENANCE BUDGET 07/01/2006-06/30/2007

MARSH ISLAND HR/TV-14/PPL6

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	$5,119.00	**$5,119.00**
General Structure Maintenance	LUMP	1	$0.00	**$0.00**
Engineering and Design	LUMP	1	$0.00	**$0.00**
Operations Contract	LUMP	1	$0.00	**$0.00**
Construction Oversight	LUMP	1	$0.00	**$0.00**

ADMINISTRATION

LDNR / CRD Admin.	LUMP	0	$0.00	$0.00
FEDERAL SPONSER Admin.	LUMP	0	$0.00	$0.00
SURVEY Admin.	LUMP	0	$0.00	$0.00
OTHER				$0.00
			TOTAL ADMINISTRATION COSTS:	**$0.00**

MAINTENANCE / CONSTRUCTION

SURVEY

SURVEY DESCRIPTION:					
Secondary Monument	EACH	0	$0.00	$0.00
Staff Gauge / Recorders	EACH	0	$0.00	$0.00
Marsh Elevation / Topography	LUMP	0	$0.00	$0.00
TBM Installation	EACH	0	$0.00	$0.00
OTHER				$0.00
			TOTAL SURVEY COSTS:	**$0.00**

GEOTECHNICAL

GEOTECH DESCRIPTION:					
Borings	EACH	0	$0.00	$0.00
OTHER				$0.00
			TOTAL GEOTECHNICAL COSTS:	**$0.00**

CONSTRUCTION

CONSTRUCTION DESCRIPTION:					
Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
	0	0.0	0	$0.00	$0.00
	0	0.0	0	$0.00	$0.00
	0	0.0	0	$0.00	$0.00
Filter Cloth / Geogrid Fabric		SQ YD	0	$0.00	$0.00
Navagation Aid		EACH	0	$0.00	$0.00
Signage		EACH	0	$0.00	$0.00
General Excavation / Fill		CU YD	0	$0.00	$0.00
Dredging		CU YD	0	$0.00	$0.00
Sheet Piles (Lin Ft or Sq Yds)			0	$0.00	$0.00
Timber Piles (each or lump sum)			0	$0.00	$0.00
Timber Members (each or lump sum)			0	$0.00	$0.00
Hardware		LUMP	1	$0.00	$0.00
Materials		LUMP	1	$0.00	$0.00
Mob / Demob		LUMP	1	$0.00	$0.00
Contingency		LUMP	1	$0.00	$0.00
General Structure Maintenance		LUMP	1	$0.00	$0.00
OTHER				$0.00	$0.00
OTHER				$0.00	$0.00
OTHER				$0.00	$0.00
				TOTAL CONSTRUCTION COSTS:	**$0.00**

TOTAL OPERATIONS AND MAINTENANCE BUDGET: **$5,119.00**

OPERATION AND MAINTENANCE BUDGET 07/01/2007-06/30/2008

MARSH ISLAND HR/TV-14/PPL6

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	$5,288.00	**$5,288.00**
General Structure Maintenance	LUMP	1	$0.00	**$0.00**
Engineering and Design	LUMP	1	$0.00	**$0.00**
Operations Contract	LUMP	1	$0.00	**$0.00**
Construction Oversight	LUMP	1	$0.00	**$0.00**

ADMINISTRATION

LDNR / CRD Admin.	LUMP	1	$0.00	$0.00
FEDERAL SPONSER Admin.	LUMP	1	$0.00	$0.00
SURVEY Admin.	LUMP	1	$0.00	$0.00
OTHER				$0.00
			TOTAL ADMINISTRATION COSTS:	**$0.00**

MAINTENANCE / CONSTRUCTION

SURVEY

SURVEY DESCRIPTION:					
Secondary Monument	EACH	0	$0.00	$0.00
Staff Gauge / Recorders	EACH	0	$0.00	$0.00
Marsh Elevation / Topography	LUMP	0	$0.00	$0.00
TBM Installation	EACH	0	$0.00	$0.00
OTHER				$0.00
			TOTAL SURVEY COSTS:	**$0.00**

GEOTECHNICAL

GEOTECH DESCRIPTION:				
Borings	EACH	0	$0.00	$0.00
OTHER				$0.00
			TOTAL GEOTECHNICAL COSTS:	**$0.00**

CONSTRUCTION

CONSTRUCTION DESCRIPTION:					
Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
	0	0.0	0	$0.00	$0.00
	0	0.0	0	$0.00	$0.00
	0	0.0	0	$0.00	$0.00
Filter Cloth / Geogrid Fabric		SQ YD	0	$0.00	$0.00
Navagation Aid		EACH	0	$0.00	$0.00
Signage		EACH	0	$0.00	$0.00
General Excavation / Fill		CU YD	0	$0.00	$0.00
Dredging		CU YD	0	$0.00	$0.00
Sheet Piles (Lin Ft or Sq Yds)			0	$0.00	$0.00
Timber Piles (each or lump sum)			0	$0.00	$0.00
Timber Members (each or lump sum)			0	$0.00	$0.00
Hardware		LUMP	1	$0.00	$0.00
Materials		LUMP	1	$0.00	$0.00
Mob / Demob		LUMP	1	$0.00	$0.00
Contingency		LUMP	1	$0.00	$0.00
General Structure Maintenance		LUMP	1	$0.00	$0.00
OTHER				$0.00	$0.00
OTHER				$0.00	$0.00
OTHER				$0.00	$0.00
				TOTAL CONSTRUCTION COSTS:	**$0.00**

TOTAL OPERATIONS AND MAINTENANCE BUDGET: **$5,288.00**

Appendix C
(Field Inspection Notes)

No inspection was conducted in calendar year 2005 because this project is currently under a maintenance event, therefore no field inspection notes were available.